

# MKIV XP | User Manual

## 1 Timer Mode *(TIME)*

### **Turn the Timer ON/OFF:**

With a battery installed, **pressing any button** will turn the MKIV XP **on**. Holding any **button down for 5 seconds** will turn the MKIV XP **off**. In addition, the MKIV XP will turn itself off after about **15 minutes** of inactivity.

### **Record Shots:**

The MKIV XP will default start in “**TIMER COMMAND**” in delay mode. To use the timer in this manner, just push the **GO** button, 2 to 3.5 seconds later you'll hear a beep - this is your go signal. As you fire, the timer will automatically display and record the shot number, split time and the time that each shot was fired. The first shot time will remain at the bottom.

#### ***EXAMPLE: “El Presidente” Drill with Timer Mode***

*Let's say you just fired an "El Presidente" (six-reload-six) you don't bother checking the target (you know you shot all "A's") but you are concerned about how you did in the time department. You check the display and it reads #012 .37 6.87 on the top line and FIRST SHOT: 1.26 on the bottom line. With no button pushing you know quite a bit about your string. First of all, the timer is telling you how many shots it heard (12) which is correct, the last shot it heard was shot number 12, which came .37 seconds after shot 11. Your total time from the start to your twelfth shot was 6.87 seconds and your first shot came at 1 .26 seconds.*

## **Review Shots Sequentially:**

Go ahead and press the **REVIEW** key. The MKIV XP will default to most recent sting in memory. If you want to look at a previous string just enter the **string number** and press **REVIEW**, otherwise press **REVIEW** again (without entering a number) to review the current string. The MKIV XP now displays the first shot on the top of the display and "FIND SHOT" on the bottom line. Each time you press **REVIEW** the timer will step to the next shot or event in memory.

## **Review a Specific Shot:**

If you are interested in how long your reload was (from the example above), **press 7** then **REVIEW**. The MKIV jumps to shot number 7 and displays "**#07 1.65 4.54**". You see that your reload took 1.65 seconds (the time between shot 6 and 7). This time is a little long and you seriously consider switching from your Six Gun to an auto-loader.

## **Printing from Review:**

If you have one of the HP IR printers you can print the string at any time after you are done firing, before or during review by pressing the **PRNT** key. *(Please note that external printers are no longer available factory-direct for this model.)*

## **Begin New String:**

To begin another string just push the **GO** button. This will clear your previous string and begin a new one.

## **Continue a String:**

If you would like the timer to add the time of your second and subsequent strings together (as you might on an IPSC standards drill) press the **CST GO** button. This will NOT clear the memory the way the **GO** button does.

**NOTE:** While this is a nifty training feature we caution you against using it in matches. If you accidentally hit normal **GO** you'll wipe the shooters string.

## **Set a PAR Time:**

The **PAR** button allows the shooter to enter a time limit (or PAR time in IPSC parlance) for a given string.

**EXAMPLE:** Set PAR time of 1.2 seconds

Push the **PAR** button. The timer will ask you to “**ENTER PAR TIME AND PRESS SET**”.

Push **1.2** (for example), **SET**. The timer now displays “**PAR TIME 1.20**” on the bottom line of the display.

**NOTE:** If you are entering a number and make a mistake use the **back arrow key to delete** the incorrect number.

Push the **GO** button. Each time the shooter fires the timer will display the shot number, split time and total time on the top line of the display as before. When 1.2 seconds comes around the timer will beep telling you that the time limit has been reached.

To turn the PAR time **off** push **PAR, SET** without entering a number.

## **Set the Delay:**

The **DLY** button allows the shooter to control the type and length of delay (if any) between the pressing of the **GO** button and the start signal. The timer defaults to a random delay of 3 to 3.5 seconds. The shooter can adjust these delay points to suit him or have the machine give him a fixed delay.

**EXAMPLE: Change the default random delay range to 5-10 seconds**

Push **DLY, YES, YES**. The MKIV will briefly display “**INPUT LIMITS AND PRESS SET**” then “**LOWER: 3.00**”. Push **5, SET**. The timer asks “**UPPER: 3.5**”. Push **10, SET** and **GO**.

This time the MKIV will start its' countdown from between 5 and 10 seconds giving you all sorts of time to psych yourself into a zombie like state of confusion.

To turn the delay **off** just push **DLY, NO, GO**. Now when you push the **GO** button the timer will beep immediately.

### **Set Benchmark(s):**

The **BNCH** button activates the PACT Benchmark feature. This allows the shooter to program the timer with a series of beeps or cues at specific times after the go signal which allow him to simulate moving and pop-up targets.

**EXAMPLE: Add benchmark times at 2, 3.5, 5, and 6.25 seconds**

Press **BNCH, YES**. The timer asks you for a time. Press **2, SET, 3.5, SET, 5, SET, 6.25, SET, GO**. The timer will beep at these times. All of the other timing features remain intact.

If you always want the same spacing between shots use the **cadence feature** described below.

## **Cadence Function:**

The Cadence Function allows you to set periodic beeps. You may also set it to begin the cadence at a specified time after the go signal or after the first shot.

**EXAMPLE:** *Set cadence to 1.5 second interval beginning at 3 seconds*

Start by restoring the defaults. Press **MENU** until you are asked if you'd like to "**Restore Defaults**" and press **YES**. From the TIMER COMMAND prompt push the **CAD, YES**. Your timer will ask you if you'd like it to start the **cadence on the first shot**, tell it **NO** this time. Enter the initial delay. This should be the time you want to take from the go signal to your first shot or click. For this drill enter **3, SET**. The **CYCLE DELAY** is the time between cadence beeps. Push **1.5, SET** then the **GO** button. The MKIV XP will give you a start signal, beep at 3 seconds then every 1.5 seconds for ever and ever.

We see this primarily a dry firing tool but you can also use it for live fire. You might have it trigger off of the first shot to take the draw time out of some sort of long range "Bill Drill" practice.

## **Keyed Beeps:**

The **KEY** button activates the Keyed Beep feature. This is a neat training tool that provides the shooter with a beep a certain number of seconds after a specific shot. This is particularly useful in practicing reloads.

**EXAMPLE:** *Keyed Beep 1.5 seconds after the 6th shot*

Press **KEY, YES**. The timer asks you for a shot number. **Push 6, SET**. You must now tell it the length of the delay, enter **1.5 SET**. As with the Benchmark function you can enter

more than one keyed beep. When you are done entering keyed beeps you can either press **SET** without entering a number to return to "TIMER COMMAND" - or you can just push the **GO** button to start the string.

Go ahead and press the **GO** button. When the timer hears your 6th shot it will start a secondary timer and give you a yell 1.5 seconds later. At first you're just getting the magazine to the gun at the beep. After some practice you find that you're almost back on target at the beep. The feedback of the timer allows you to objectively evaluate equipment and technique. You could also use multiple keyed beeps off of the same shot to break the reload down some more.

### **Keyboard Lock Out:**

In order to prevent accidental resetting of the timer during a shooters run (a problem in movement stages where the RO runs with the shooter and leaves his finger on the **GO** button) the MKIV XP has a keyboard lockout feature.

To activate it push the **OPTN** button until the timer asks "Lock out go keys?" Push **YES** and the timer will lock its' keyboard after the next **GO** command. To reset the timer push the **REVIEW** key. This time the timer asks "ENABLE GO KEY?" Push **YES** and you're back in business.

The **PAR** and **DLY** keys will remain hot. They are far enough out of the way that this does not pose a problem. We wanted to keep those commonly used features easily accessible.

### **Lead Calculator:**

The second option on the Timer Mode **OPTN** menu allows the shooter to calculate lead based on the velocity of the bullet and target, and the distance to the target. Note that this is the lead in a vacuum. No allowance has been made for the deceleration of the bullet. At close pistol ranges (25 yards) this error is small. However we do not recommend this function for use at long range.

**EXAMPLE:** Set a lead based off of an object going 30 FPS at 15 yards from the shooter.

Press **OPTN, OPTN, YES**. The MKIV XP asks you for the velocity of your ammo. Enter **1050, SET** with a target range of 15 yards enter **15, SET** and a target velocity of 30 FPS enter **30, SET**. The timer tells you that the lead required to bust this running Jack Rabbit is *15.1 inches*. If this is getting too easy try starting from the leather.

## 2 Rate of Fire Mode *(RPM)*

**Rate of Fire Mode** allows you to record the Rounds Per Minute (RPM) of your weapon up to 600 RPM. To begin press the **RPM** button. The MKIV XP now displays “**FULL AUTO CMD:**”. Press the **GO** button. Instead of giving you a go beep the timer displays “**FIRE WHEN READY**”. Fire a fairly long burst of a known number of rounds (so you have enough data to be meaningful). You'll note that the timer is now displaying you time to the thousandth of a second.

Press **REVIEW** and the timer will tell you the number of rounds fired, the total time and the cycle rate. Remember that the total number of cycles is one less than the number of shots fired.

## 3 Chronograph Mode *(CHRN)*

**WARNING:** Always wear eye protection when shooting! Do NOT place armor plate in front of your sky screens! If you shoot a plate of steel a few feet in front of your face, bits of metal will fly back at you and rip your eyes out!

## **General Setup and Tips on the Skyscreen System:**

1. The closest Skyscreen sensor should be **5-10 ft. downrange** from the shooter.
2. Aim so the bullet passes over the center of each screen at an altitude of between **4 and 8 inches above the sensor and centered**.
3. Cables should be **on the ground** as much as possible.
4. Cables should be **separate** from each other.
5. Make sure the unit itself is **NOT** being hit by **Muzzle Blast** - Isolate the unit from the shockwave
6. Make sure you are using a **newly purchased, fully-charged battery**.
7. **Bright overcast days** work very well
8. On **VERY bright blue sky days**, try **canting** the sensors over **60 to 90 degrees** either left or right. That will likely increase the contrast of the bullet to the diffuser improving the ability to detect the bullet.
9. If shooting **indoors**, you will have to rig an **incandescent light** over each screen, or get our M7 IR Skyscreen Upgrade Kit.

## **Connect the SkyScreens to the MKIV XP**

Plug the first screen into the **START** plug located on the back of your timer, and the second screen into the **STOP** plug. Switch the timer on, from "**TIMER COMMAND**" push the **CHRN** button. The timer will switch to "**CHRONO COMMAND**" and display the current screen separation on the bottom line of the display. If you need to adjust the screen separation, you can do so now. The default is 18" which is what our new M7 Skyscreen System is set to.

***NOTE:** Older PACT screens will have 24" separation. To set a different screen separation, just push the **SET** key and enter your separation in inches then press **SET** again.*

## **Record Shots**

Push the **GO** button, the timer will display "**Chronograph mode running**". Fire a round over your Skyscreens. The display should say something like this:



#001	856.2 FPS
AV	856.2 FPS

Each time you fire, the shot number and velocity of your last shot will appear on the top line of the display and your current average velocity will appear on the bottom.

Now let's say that an odd-ball velocity appears, like "**6952.3 FPS**". This is an obvious error. You can remove it from memory by pushing the **NO** key. The MKIV XP will "back up" to the previous shot.

***NOTE:** The MKIV XP needs one second between shots. This is to allow the smoke to clear. If you fire too soon, the Chronograph will not record the shot.*

When you are done with your string, the MKIV XP will provide you with a statistical summary of your string. If you have a printer just push the **PRNT** key and you will receive a hard copy of your string number, statistical summary and each shot. In addition, all chrono data is held in memory for download to your PC.

Push **REVIEW** to review the desired string. If you want to look at the most recent string push **REVIEW** again. The highest and lowest shot velocities and their corresponding shot numbers are displayed.

HI #003	868.2 FPS
LO #007	823.5 FPS

Press **REVIEW** again. The Standard Deviation of your string is displayed in addition the SD is displayed as a percent of your average velocity (coefficient of variation).

SD	45.8 FPS
CV	5.99%

Push **REVIEW** again. The MKIV XP calculates the **Mean Absolute Deviation** (average variation) of your string and once again displays it as a percent of your average velocity. This number is the key to measuring and comparing the velocity variations in your loads. The load illustrated varies an average of 5.02%. This is the number that should be used to compare one load to another. The smaller the better.

<b>MAD</b>	<b>38.4</b>
<b>CV</b>	<b>5.02%</b>

One more time, press **REVIEW**. "**ES**" stands for Extreme Spread which is the difference between the high and low shot velocities. "**AVRG**" is obviously the average velocity of you string. At this point you can continue to press the review key and review each shot. The "**FIND SHOT**" function is identical to counterpart in timer mode.

<b>ES</b>	<b>105.9 FPS</b>
<b>AVRG</b>	<b>763.8 FPS</b>

You can **EDIT** out individual bad shots with the **NO** button during review. The MKIV XP will recalculate your statistical summary less the edited shots.

When you are done reviewing your data, you can push the **GO** button and the timer will clear its memory an you can start another string. Also, you can push **CST GO** (Comstock Go) and add more shots to the existing database.

**NOTE:** If you don't want to mess around with all the review functions, you can start a fresh string by pushing **GO** at any time.

## Automatic Power Factoring (APF):

With **CHRONO COMMAND** displayed on the screen push the **PAR** button. The timer will ask you to “**ENTER BULLET WEIGHT AND PUSH SET**”. Push **2, 0, 0, SET**. Now press the **GO** button and chronograph a shot.

<b>ES</b>	<b>105.9 FPS</b>
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<b>AVRG</b>	<b>763.8 FPS</b>
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Remember that the power factor for the individual shot is displayed, not the average.

## 4 Ballistic Computer (*TRAJ*)

The **Ballistic Calculator** is so easy to use that you really don't need much explanation. It does however, have some trick features that may not be apparent on the first pass.

### Use Chrono Data:

From “**TIMER COMMAND**” press **TRAJ**. The first thing the Ballistic Computer needs to know is the velocity to base the calculation on. If you're shooting at the range it will pick up the current average velocity (which you can override) from the chronograph. If none is present in memory it will **default to 2500.0 FPS**.

### Enter a Velocity Manually:

If you want to **change the default**, stay away from the **SET** key and first tell the machine what it needs to know. For example, if you want the machine to use “2650 FPS” for its calculation just type “**2650**”. If you make a mistake entering a number just use the **back arrow key** then **GO** to erase it. When the number entered is ok with you hit **SET** and the Ballistic Calculator will accept it and move to the next screen.

**NOTE: Yes/No questions** are answered with the **YES** and **NO** keys. No **SET** is required. Also, Any time you are messing around with the Ballistic Calculator and you realize you've painted yourself into a corner hit (gently now) the **NO** button until you exit the mode. This will take you out of the Ballistic Calculator. Then hit **TRAJ** again and it will let you start from the beginning with the last things you entered as the defaults.

**EXAMPLE:** Make a trajectory printout

If you haven't already pressed the **TRAJ** do so now so that the screen shows:

**ENTER VELOCITY: 2500.0**

Let's change the velocity to **2650** and press **SET**. The Ballistic Calculator will now ask you for the **Ballistic Coefficient (BC)**. This is always a decimal number but the Ballistic Calculator is smart enough to add the decimal if you forget it. Enter a BC of **.475** and press **SET**.

**NOTE:** The Ballistic Calculator will only produce correct results with "C1" ballistic coefficients. This is the industry standard and is what you will find in every bullet manufactures current specifications even if they don't label it as "C1"

### **Enter Conditions:**

Next the Ballistic Calculator asks you if you want it to use Standard (sea level, 59 degrees) or **Nonstandard** conditions. Tell it **YES** to accept the standard conditions. If you answer **NO** it will ask you for altitude and temperature information. Based on the data the Ballistic Calculator will correct the BC to your nonstandard conditions.

### **Enter Sight Height:**

Sight height is the distance from the center of the bore to the center of your sight. If you're just playing around, use the **default of 1.5"**. However if you're making a "for real" field drop card do it right and measure the thing (a pain in the back side). If you're using an iron sight gun (particularly handguns) don't use the 1.5" number at all. It's so far from your gun that the resultant trajectory data will be pretty bad.

### **Maximum Point Blank Range:**

The Ballistic Calculator now has all the data it needs for the trajectory calculation. You'll now need to tell the Ballistic Calculator what sort of zero you want. If you select the **MAX PB RANGE** the Ballistic Calculator will find the maximum range at which you can fire the gun without the bullet traveling more than so many inches above or below the line of sight.

This option is strongly recommended for field marksman (hunters and warriors). The default value is a **six inch "vital zone."** This means that you'll end up with a zero that keeps the bullet within an imaginary six inch tube (three inches above to three inches below the line of sight) from the muzzle to the maximum "point blank" range. The Ballistic Calculator will tell you where to zero at 100 yards for this and print a drop table according to that zero.

### **Specific Range:**

The second option of **SPECIFIC RANGE** is of use to target shooters. If your local range only goes to 100 yards but your competition is at 500 yards you can have the Ballistic Calculator figure out where to set your gun at 100 to be dead on at 500. Again it will print you a drop table based on that zero. One neat trick we added to this zero option is the ability to offset the zero. Normally when the Ballistic Calculator asks you if you want an

offset you'd just hit **SET** to accept the zero default. However, if you've got a gun in the safe that you have already zeroed two inches high at 100 you can use this feature to back into a drop table that puts the bullet two inches high at 100. The offset option will add about 20 seconds to the drop calculation. It is, however, quite a bit faster than rezeroing your gun.

The next three questions (starting range ending range and increment) are self explanatory. You'll probably find yourself hitting the **SET** key three times to accept each default. The final question is whether or not you want the Ballistic Calculator to print to the screen or paper. If you opt for a paper print out the MKIV XP will go on automatic from here giving you a print out based on your parameters. If you want to print to the screen you'll use the **SET** button to advance from screen to screen. To make another print out just push **TRAJ** again. All of the parameters you used on the last print out will appear as defaults (assuming you did not turn the machine off) speeding data entry.

## 5 Additional Functions

### Send Shot Data to PC:

“**Send To PC**” is the first question asked under the **OPTN** button. It will activate the USB port on the back of the unit. In order to utilize this feature you must do the following:

1. **Download** and **install** the MKIV XP Shot Browser Software - <http://bit.ly/2qNV30D>
2. **Plugin the MKIV XP** to your computer's **Serial Port** (Don't have a serial port? You can purchase a serial to USB cord on Amazon - <https://amzn.to/2HDECOQ> )
3. Open the program (If you are using anything newer than Windows XP you'll need to open the program in **Windows Compatibility Mode** - <http://bit.ly/2HgDtxl> )
4. Send data to the PC using the instructions on the program.
5. You'll then see options to retrieve stored **Timer**, **Chrono** and **Rate OF Fire** data to your PC and save it for review with a spreadsheet or word processor.

## **Clear the Memory:**

In short, to clear your MKIV XP memory, you'll turn on the unit and cycle through the options the **SET/MENU** button provides until you get to "**Delete ALL Strings? (N)**". At that point you'll press **PRNT/YES** to clear it and then finish cycling through the options. You'll need to do this for the Timer and Chronograph mode to clear the full memory.

## **6** Chronograph Troubleshooting *(RPM)*

### **Accuracy and Tolerance Recommendation:**

Having worked with dozens of chronographs, we strongly recommend to give yourself some leeway on the velocity of your match ammo. In other words, if you need 850 FPS to make Major, don't load 851 and think you are safe. The problem is not inaccuracies of the chronograph, but rather the variation in the performance of ammo due to weather conditions. We recommend that you give yourself at least a 25 fps cushion, 50 fps would be better.

The skyscreens just eat batteries, such are the laws of physics. Whenever the screens are plugged in the Chronograph detection circuit is on. When you are done chronographing, **unplug the screens.**

### **Troubleshooting:**

Many light sensitive chronographs have a reputation for being flaky under certain light conditions. We have gone to great lengths to minimize this problem on the new XP series, but you will still occasionally run into a combination of conditions that may make it hard for your chrono to read. It will help if you develop an understanding of how your chronograph works.

Your MKIV XP is looking for a decrease in light level when the bullet passes over the screen. Assuming that enough light was entering the screen to begin with, your MKIV XP will always get

an accurate reading. If, on the other hand, the light level increases as the bullet crosses the skyscreen, you will probably get no reading at all.

If you find that your MKIV XP is having trouble getting readings on a sunny day with a dark blue sky you should try shooting lower over the skyscreens. You may eliminate the problem by changing the light conditions just a bit by tilting your Skyscreens or changing the direction of the sun. You will find the MKIV XP will operate in very low light conditions, but at some point there will not be enough light to see the bullet.

### **Muzzle Blast:**

When you fire a supersonic round the bullet gets to the skyscreen before the blast does. Keep the muzzle a **5-10 ft. back** from the first skyscreen to keep from beating it up. Remember that the farther your screens are from the muzzle the lower the velocity your chronograph will read (the bullet starts slowing down as soon as it leaves the barrel).

If you ever have a problem with your MKIV XP that you can't resolve please don't suffer in silence! Go to our support section of our website at <https://pact.com> or shoot us an email to [info@pact.com](mailto:info@pact.com).

***WARNING:*** *Shooting is dangerous. It is up to you to conduct yourself in a safe manner at all times following established procedures as outlined by Firearms and Ammunition manufacturers. Failing to do so may result in the death or severe injury of yourself and others, as well as earning you a place in the Darwin Awards.*

**DON'T BE A DUMB ASS!  
ALWAYS WEAR EYE PROTECTION!  
GOOD LUCK AND GOOD SHOOTING!**